

## 2. ABSTRACT

**Title:** Collaborative Research: Enhancing operational drought monitoring and prediction products through synthesis of N-LDAS and CPPA research results

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**Total proposed cost:** \$549,896; (Princeton: \$297,700; UW: \$252,196)

**Budget Period:** May 1, 2010 – April 30, 2013 (3 years)

Drought has had tremendous societal and economic impacts on the United States. In April 2003 the Western Governors in partnership with NOAA initiated planning for a *National Integrated Drought Information System (NIDIS)*, which was implemented by Congress with NOAA as the lead agency. The NIDIS concept is that drought management should be risk-based, and aimed at better quantitative monitoring, early warning and prediction. The NOAA Climate Test Bed (CTB) was established “*To accelerate the transition of scientific advances from the climate research community to improved NOAA climate forecast products and services*”. Studies over the last two decades have demonstrated the feasibility of making useful seasonal climate predictions, with the expectation that associated outlooks and forecasts can contribute to seasonal hydrologic and drought prediction capabilities. Developing a seasonal hydrological and drought forecasting capability has been the goal of the NOAA Climate Program Office’s (CPO) Climate Prediction Program for the Americas (CPPA) through its research support to external investigators, including the PIs, and CPPA’s Core Project funding to NCEP’s Environmental Modeling Center (EMC) and the NWS Office of Hydrologic Development (OHD) in support of the North American Land Data Assimilation System (NLDAS). We propose herein to transition, in cooperation with EMC and the NOAA Climate Prediction Center (CPC), advances in seasonal hydrological and drought forecasting made at Princeton University and the University of Washington to the CTB. This constitutes a critical next step in enhancing CPC’s operational drought prediction capabilities.

This proposal responds to priority area 3 of the FY 2010 CTB Information Sheet: *Enhancing Operational Drought Forecast Products and Applications*. Operationally, CPC provides leadership in drought assessments within NOAA by providing drought outlooks and monitoring through its contributions to the National Drought Monitor (DM) and its Seasonal Drought Outlook (DO). Current procedures underlying the DM and DO rely on a suite of information that includes primarily qualitative evaluations of current hydrologic and agricultural conditions, combined with (in the case of the DO) seasonal climate forecasts. CPC would like to transition to *objective* drought monitoring and prediction approaches. EMC, through funding from CPPA, has executed pilot demonstrations of a multi-model hydrological drought monitoring system based in substantial part on approaches developed by the PIs and implemented in experimental systems at the PIs’ institutions, e.g. the University of Washington National Surface Water Monitor. Both PIs have participated extensively in adaptation of CPPA-funded research to these EMC pilot demonstrations.

The proposed project will transition the multi-model seasonal hydrologic and drought monitoring and prediction capabilities developed by the PIs and EMC to the CTB. These existing pilot systems use procedures developed by the PIs that bias correct and downscale seasonal forecasts from CFS dynamical forecasts and CPC official outlook products, as well as simpler methods that resample from climatologies. NLDAS products are used to provide initial conditions for the hydrological and drought predictions as well as real-time monitoring of drought. Overall, these activities have demonstrated that the systems are now sufficiently mature to merit a more rigorous, robust and continuous execution and evaluation via the Climate Test Bed (CTB). We will work closely with our EMC and CPC collaborators to implement a drought monitoring and prediction system in the CTB. Testing and evaluation of the system will utilize the NIDIS Southeast testbed, with special attention to the Savannah and Apalachicola-Chattahoochee-Flint River basins, the latter of which is the water supply source for Atlanta, which has been particularly prone to drought in recent years.